

REMARKS

Entry of the above amendment is respectfully requested. Claims 19, 57 and 58 have been amended and new claim 59 has been added pursuant to the discussion with the Examiner in the telephonic interview of January 14, 2005. Claims 19-27, 29, 30 and 48-59 are currently pending in the application. Favorable reconsideration allowance of this application is respectfully requested in light of the foregoing amendments and the remarks that follow.

1. Rejection Under 35 U.S.C. Section 102(b)

The rejection of claims 19-24, 27, 29, 30 and 48-58 as being anticipated by D. Reay, "Learning from Experiences with Compact heat Exchangers" (the Reay reference) is respectfully traversed, because, inter alia, independent claims 19, 57 and 58 from which the remaining claims in this rejection depend, results in subject matter not discussed in any of the cited prior art references. Specifically, the Examiner correctly recognizes that Figure 8.3 of the Reay reference discloses a reactor including a reaction zone and a heat exchanger in operative contact with the reaction zone. However, the Examiner fails to recognize material differences between the heat exchanger shown in the Reay reference and the claimed invention.

Specifically, as amended claims 19, 57 and 58 now require, inter alia, that the reactor include a reaction zone that receives reactants for reaction purposes only and a heat exchanger in operative contact with the reaction zone. The heat exchanger receives the reactants upon exiting the reaction zone for heat exchange purposes only and is formed from a heat exchange panel having a number of printed circuit heat exchange (PCHE) plates with fluid flow channels that are chemically or hydraulically etched, or etched by water jet in each plate to a desired depth on one or both sides of the plates. (Specification p. 8, lines 22-31; and p. 12, lines 15-23). These

channels are aligned when the plates are assembled to define discrete heat exchange medium pathways, and are diffusion bonded together in this alignment. By utilizing a heat exchanger formed of the PCHE plates to receive the reactants exiting the reaction zone, close control of the reactant temperature profile through the use of heat exchanger can be achieved between the reaction zones of the reactor to optimize the reactions occurring in the adjacent reaction zones and consequently optimize the product concentrations achieved in the reactor.

In contrast, with regard to the Reay reference, the discussion in this reference regarding the PCHEs does not in any way disclose the application of heat exchangers formed of PCHE plates in operative contact with a reaction zone of a chemical reactor. The focus of the Reay reference is a discussion of the various design features and operating conditions in which it is possible to use heat exchangers formed with PCHE panels, and the only mention of any particular use of these panels is with regard to compressor after-coolers, gas coolers, gas dehydration trains, and cryogenic processes for removal of inert substances from streams. Further, Figure 8.3 of the Reay reference illustrates a heat exchanger-reactor in which reactants introduced on one side of the exchanger-reactor are reacted and simultaneously cooled in the reactor to form the desired products. Thus, the heat exchange and reaction functions are each performed simultaneously in the heat exchanger-reactor, which greatly reduces the ability of the heat exchanger to control the temperature profile of the reactants. Therefore, the Reay reference does not disclose in any manner the use of a heat exchanger positioned in operative contact with a reaction zone that receives reactants exiting the reaction zone for subsequent heat exchange purposes only, and that is formed of a PCHE panel or panels as required by claims 19, 57 and 58.

Dependent claims 20-24, 27, 29, 30 and 48-56 are also believed to be in condition for allowance for incorporating by reference the limitations of claim 19 and for defining additional features of the invention, which, when considered in combination with claim 19, are not anticipated by the prior art relied upon in the rejection.

Furthermore, while not specifically included in this rejection, claims 57 and 58 have been amended in a manner similar to claim 19 such that each of these claims requires that reactants exiting a reaction zone subsequently enter the heat exchanger for heat exchange purposes. For this reason, applicant believes that claims 57 and 58 are also not anticipated by the prior art relied upon in the rejection.

In light of the forgoing, applicant respectfully requests the withdrawal of the rejections of claims 19-24, 27, 29 and 48-58.

Also, with this response applicant has added new independent claim 59 which is highly similar in scope to claim 19. Specifically, claim 59 has the limitations of a first reaction zone which receives reactants for reaction purposes, a heat exchanger that is positioned in operative contact with and receives reactants from the first reaction zone for heat exchange purposes, and that is formed of a number of PCHE panels to define discrete fluid pathways within the heat exchanger, and a second reaction zone positioned in operative contact with the heat exchanger opposite the first reaction zone that receives reactants from the heat exchanger for reaction purposes. Claim 59 therefore covers a reactor in which reactants from a first reaction zone exit the first zone and pass into the heat exchanger for heat exchange purposes, and which subsequently exit the heat exchanger and enter a second reaction zone limitations which are supported by Figure 1, and the relevant discussion of this figure, in the application.

Therefore, for the same reasons stated previously regarding the rejection of claims 19, 57 and 58, in applicant's opinion the Reay reference does not disclose a heat exchanger formed from PCHE plates that receives reactants for heat exchange purposes from a first reaction zone that receives reactants for reaction purposes, and that subsequently directs the reactants to a second reaction zone for reaction purposes, as required by claim 59 such that applicant believes claim 59 is allowable.

2. Rejections Under 35 U.S.C. Section 103(a)

The rejection of claims 25 and 26 under 35 U.S.C. Section 103(a) as being unpatenable over the '351 patent, or the '064 application or the Reay reference is respectfully traversed, because, inter alia, there is no teaching or suggestion to combine or modify the references to produce the claim invention. Furthermore, even if the references were combined, the claimed invention would not result.

Claims 25 and 26 depend from independent claim 19 and consequently include all the limitations found in claim 19. As discussed previously, the Reay reference does not disclose each of the elements of claim 19, specifically all of the components of the reactor including the reaction zone that receives reactants for reaction purposes and the heat exchanger formed of PCHE panels including fluid flow channels that receives reactants from the reaction zone for heat exchange purposes. Further, even if the Reay reference and either the '351 patent or the '064 application were combined, none of these references disclose the use of a heat exchanger, formed of PCHE panels or not, that is disposed in operative contact with a reaction zone of a reactor as required by claim 19. As a result, because the Reay reference fails to disclose or suggest the combination of each of the elements of claim 19, from which claims 25 and 26

depend, this prior art reference also fails to disclose or suggest the combination of the elements of claims 25 and 26.

In light of the foregoing, withdrawal of the rejections of claims 25 and 26 is respectfully requested.

3. Discussion of Advisory Action

After the initial filing of this response, the Examiner issued the Advisory Action on February 15, 2005 in which the Examiner stated that the applicant had narrowed independent claims 19, 57 and 58 in the manner discussed by applicant's attorney and the Examiner during the telephone interview of January 14, 2005 during which these changes were stated as being allowable over the prior art of record by the Examiner. In the Advisory Action, the Examiner goes on to state that the claim amendments require further searching and consideration as the claimed invention is now pertained to different zones and wherein reactants are flowing from one zone to another.

Applicant respectfully disagrees with the Examiner's conclusion concerning the claim amendments. In the previously filed and considered claims of this application, claim 24 depends from claim 19 and further limits the claim by reciting that the reactor has "a plurality of reaction zones are arranged in succession, and wherein a heat exchange panel is arranged between each set of adjacent reaction zones." In applicant's opinion, claim 24 requires that the reactor includes different zones where the reactants flow subsequently from one zone to another, which is subject matter similar to, but narrower in scope than the amendments made to each of claims 19, 57 and 58 that was discussed by the Examiner as being allowable over the prior art of record. As a result, the subject matter of the claim amendments made by applicant's attorney in the response

filed January 31, 2005, which were cited by the Examiner in the Advisory Action as requiring further search and consideration was, in fact, previously presented in the application prior to the issuance of both the Final Rejection and Advisory Action. As such, applicant's amendments to claims 19, 57 and 58 are directed to an aspect of the invention which has already been searched and considered by the Examiner with regard to claim 24. Therefore, these amendments to claims 19, 57 and 58 should not require any additional search or consideration contrary to the Examiner's assertion. Thus, applicant believes that a Notice of Allowance is in order with respect to this application.

CONCLUSION

It is submitted that claims 19-27, 29, 30 and 48-59 are in compliance with 35 U.S.C. §§ 102 and 103 and each defines patentable subject matter. A Notice of Allowance is therefore respectfully requested.

Enclosed is a check for \$120.00, which includes the government filing fee by a *large* entity for a one-month extension of time, which applicant hereby requests. No other fees are believed to be payable with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayment to Deposit Account No. 50-1170.

In view of the forgoing remarks, the application is believed to be in prima facie condition for allowance, and such action is earnestly requested. The Examiner is invited to contact the undersigned by telephone if it would help expedite the prosecution and allowance of this application.

Respectfully submitted,



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